



## MONTHLY PROGRESS REPORT

**"HTS Josephson Technology on Silicon with Application to  
High Speed Digital Microelectronics"**

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## Summary of Progress

**Task 1 - Josephson Junction Fabrication and Testing-** Two films of YSZ buffered YBCO films were grown on silicon substrates and sent to Professor Gurvitch's laboratory at SUNY at Stony Brook. The films were tested for resistance vs temperature (see Fig. 1) and displayed excellent ( $< 2$  K) transition widths. Work there is currently underway at Stony Brook to fabricate Josephson junctions.

**Task 2- RSFQ Modeling and Design -** Exploratory analysis on the high frequency properties of thin, single layer superconducting transmission lines has been commenced. Because of the constraints that film stress place on film thickness, we are presently limited to YBCO films below 70 nm thick. This will likely have a significant impact on transmission line inductance and attenuation.

**Task 3 - RSFQ circuit fabrication and Testing -** Arrangements have been made with the Cryoelectronics group at the National Institute of Standards and Technology to perform microwave surface resistance measurements on our standard YBCO/silicon films.

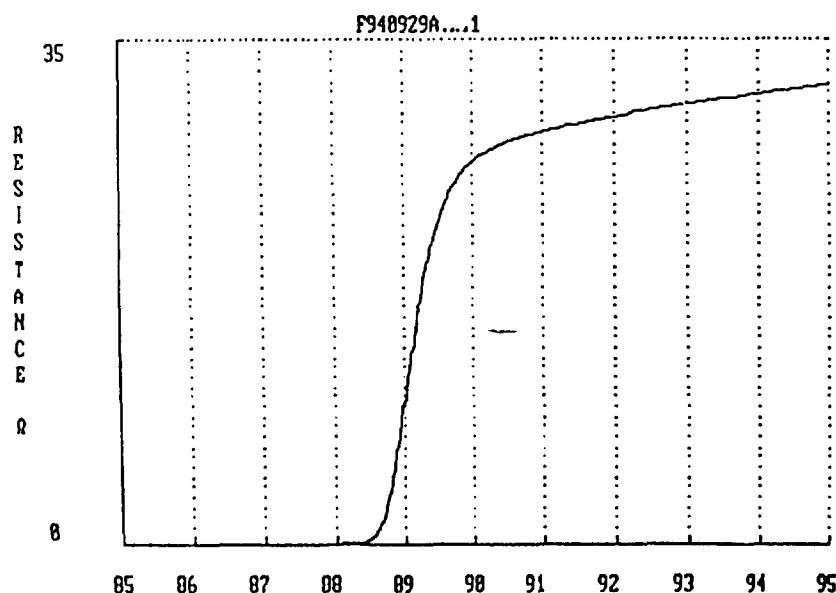


Fig. 1. R vs T of YBCO Film to be processed into junctions.

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*Peter Rosenthal*  
Peter A. Rosenthal, Senior Physicist